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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/061,066	01/29/2002	Adrian Stoica	NPO-20773-1-CU	7632
39521	7590	02/13/2006	EXAMINER	
NASA MANAGEMENT OFFICE JET PROPULSION LABORATORY MAIL CODE: 180-200 4800 OAK GROVE DRIVE PASADENA, CA 91109			LUU, CUONG V	
			ART UNIT	PAPER NUMBER
			2128	
DATE MAILED: 02/13/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/061,066	STOICA, ADRIAN	
	<b>Examiner</b>	<b>Art Unit</b>	
	Cuong V. Luu	2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 05 January 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 1/5/2006 has been entered.

**DETAILED ACTION**

Claims 1-27 are pending. Claims 1-27 have been examined. Claims 1-27 have been rejected.

***Response to Arguments***

1. Applicant's arguments, see pp. 2-4, filed 1/5/2006, with respect to claims 1-14, 21-27 have been fully considered and are persuasive. The rejection of claims 1-14, and 21-27 has been withdrawn.
2. Applicant's arguments, see pp. 2-4, filed 1/5/2006, with respect to the rejections of claims 15-20 under U.S.C. 102(b) have been fully considered and are persuasive. Therefore, the rejections have been withdrawn. However, upon further consideration, a new ground of rejection is made in view of Weste et al (p. 444, section 6.6.1.5. Modes mentioned in this section are resolutions or levels of accuracy for simulation. At transistor level it is more accurate than gate/logic level, which is more accurate than block level).

It would have been obvious to one of ordinary skill in the art to combine the teachings of Stoica et al and Weste et al. Weste et al's teaching would have speed up the simulation since only those circuits requiring detailed simulation expend expensive computing time.

### ***Claim Rejections - 35 USC § 101***

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

**Claims 1-27 are rejected under 35 U.S.C. 101 because the claimed invention is drawn to non-statutory subject matter. The Examiner submits that Applicants have not recited any limitations relating to a practical application in the technological arts and have merely claimed a manipulation of abstract ideas (see MPEP 2106).**

*Section 2106 [R-2] (Patentable Subject Matter - Computer-Related Inventions) of the MPEP recites the following:*

*“In practical terms, claims define nonstatutory processes if they:*  
*- consist solely of mathematical operations without some claimed practical application (i.e., executing a “mathematical algorithm”); or*  
*- simply manipulate abstract ideas, e.g., a bid (Schrader, 22 F.3d at 293-94, 30 USPQ2d at 1458-59) or a bubble hierarchy (Warmerdam, 33 F.3d at 1360, 31 USPQ2d at 1759), without some claimed practical application.”*

*An invention which is eligible for patenting under 35 U.S.C. § 101 is in the “useful arts” when it is a machine, manufacture, process or composition of matter, which produces a concrete, tangible, and useful result. The fundamental test for patent eligibility is thus to determine whether the claimed invention produces a “useful, concrete and tangible result.” The test for practical application as applied by the examiner involves the determination of the following factors:*

*(1) “Useful” - The Supreme Court in Diamond v. Diehr requires that the examiner look at the claimed invention as a whole and compare any asserted utility with the claimed invention to determine whether the asserted utility is accomplished.*

*(2) “Tangible” - Applying In re Warmerdam, 33 F.3d 1354, 31 USPQ2d 1754 (Fed. Cir. 1994), the examiner will determine whether there is simply a mathematical construct claimed, such as a disembodied data structure and method of making it. If so, the claim involves no more than a manipulation of an abstract idea and therefore, is nonstatutory under 35 U.S.C. § 101. In Warmerdam the abstract idea of a data structure became capable of producing a useful result when it was fixed in a tangible medium, which enabled its functionality to be realized.*

*(3) “Concrete” - Another consideration is whether the invention produces a “concrete” result. Usually, this question arises when a result cannot be assured. An appropriate rejection under 35 U.S.C. § 101 should be accompanied by a lack of enablement rejection, because the invention cannot operate as*

*intended without undue experimentation.*

3. As per claim 1, the Examiner respectfully submits, under current PTO practice, that the claimed invention does not recite either a useful, concrete, or tangible result and is merely drawn to a manipulation of abstract ideas.
  - The invention is not useful since the claimed "A method of evolving a circuit from plural candidate circuits" does not recite a result (post process) that is useful in the technological art. This makes it difficult to determine the Applicant's invention since it merely claims a manipulation of abstract ideas. (The patent eligibility standard requires **significant functionality to be present to satisfy the useful result aspect** of the practical application requirement. See *Arrhythmia*, 958 F.2d at 1057, 22 USPQ2d at 1036.)
  - The claim is not tangible since the result of "a method of evolving a circuit from plural candidate circuits" is undefined.
  - The claim is not concrete because the results are not assured.
4. Dependent claims 2-7 inherit the defect as being dependent from independent claim 1.
5. As per claim 8, the Examiner respectfully submits, under current PTO practice, that the claimed invention does not recite either a useful, concrete, or tangible result and is merely drawn to a manipulation of abstract ideas.
  - The invention is not useful since the claimed "A method of evolving a circuit from plural candidate circuits" does not recite a result (post process) that is useful in the technological art. This makes it difficult to determine the Applicant's invention since it merely claims a manipulation of abstract ideas. (The patent eligibility standard

requires **significant functionality to be present to satisfy the useful result aspect** of the practical application requirement. See Arrhythmia, 958 F.2d at 1057, 22 USPQ2d at 1036.)

- The claim is not tangible since the result of “a method of evolving a circuit from plural candidate circuits” is undefined.
  - The claim is not concrete because the results are not assured.
6. Dependent claims 9-14 inherit the defect as being dependent from independent claim 8.
7. As per claim 15, the Examiner respectfully submits, under current PTO practice, that the claimed invention does not recite either a useful, concrete, or tangible result and is merely drawn to a manipulation of abstract ideas.
- The invention is not useful since the claimed “A method of evolving a circuit” does not recite a **result** (post process) that is useful in the technological art. This makes it difficult to determine the Applicant's invention since it merely claims a manipulation of abstract ideas. (The patent eligibility standard requires **significant functionality to be present to satisfy the useful result aspect** of the practical application requirement. See Arrhythmia, 958 F.2d at 1057, 22 USPQ2d at 1036.)
  - The claim is not tangible since the result of “a method of evolving a circuit” is undefined.
  - The claim is not concrete because the results are not assured.
8. Dependent claims 16-20 inherit the defect as being dependent from independent claim 15.
9. As per claim 21, the Examiner respectfully submits, under current PTO practice, that the

claimed invention does not recite either a useful, concrete, or tangible result and is merely drawn to a manipulation of abstract ideas.

- The invention is not useful since the claimed "A method of circuit model selection" does not recite a result (post process) that is useful in the technological art. This makes it difficult to determine the Applicant's invention since it merely claims a manipulation of abstract ideas. (The patent eligibility standard requires significant functionality to be present to satisfy the useful result aspect of the practical application requirement. See Arrhythmia, 958 F.2d at 1057, 22 USPQ2d at 1036.)
- The claim is not tangible since the result of "a method of evolving a circuit" is undefined.
- The claim is not concrete because the results are not assured.

10. Dependent claims 22-27 inherit the defect as being dependent from independent claim 21.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

**Claims 1-27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

11. Regarding claim 1, the phrase " producing a simulation model for each one of at least said subset of said candidate circuits by configuring configurable model assigned to the one candidate circuit in accordance with the one candidate circuit, whereby to produce plurality

of simulation models corresponding to at least said subset said candidate circuits whose resolutions are distributed among said different levels model resolutions" renders the claim indefinite because it is unclear what the applicants mean. See MPEP § 2173.05(d). For the purpose of examining the claim, the examiner interprets this limitation as "producing plural simulation models for each one of at least set subset of said candidate circuits by configuring each configurable model in accordance with the one candidate circuit, whereby to produce a plurality of simulation models for each candidate circuit corresponding to different levels of model resolutions".

In addition, it is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The applicants state "a method of evolving a circuit from a plural candidate circuits". It is unclear what type of circuit the applicants intend to apply the method, electronic circuits, pneumatic device circuits, or another type of circuit.

12. Dependent claims 2-7 inherit the defect as being dependent from independent claim 1.

13. Regarding claim 8, it is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The applicants state "a method of evolving a circuit from a plural candidate circuits". It is unclear what type of circuit the applicants intend to apply the method, electronic circuits, pneumatic device circuits, or another type of circuit.

14. Dependent claims 9-14 inherit the defect as being dependent from independent claim 8.

15. Regarding claim 15, it is rejected under 35 U.S.C. 112, second paragraph, as being



indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The applicants state "a method of evolving a circuit". It is unclear what type of circuit the applicants intend to apply the method, electronic circuit, pneumatic device circuit, or another type of circuit.

16. Dependent claims 16-20 inherit the defect as being dependent from independent claim 15.

17. Regarding claim 16, the phrase " wherein each candidate circuit is modeled using models corresponding to all levels of resolution, and wherein fitness functions obtained from said models for each candidate circuit are combined in evaluating the candidate circuit" renders the claim indefinite because it is unclear whether the applicants mean that each candidate circuit is modeled several times using models corresponding to all levels of resolution or that each candidate circuit is modeled only one time. See MPEP § 2173.05(d). For the purpose of examining the claim, the examiner interprets it as each candidate circuit is modeled several times using models corresponding to all levels of resolution in order for the subsequent phrase "and wherein fitness functions obtained from said models for each candidate circuit are combined in evaluating the candidate circuit" to make sense.

18. Regarding claim 21, the phrase " producing a simulation model for each one of at least said subset of said candidate circuits by configuring configurable model assigned to the one candidate circuit in accordance with the one candidate circuit, whereby to produce plurality of simulation models corresponding to at least said subset said candidate circuits whose resolutions are distributed among said different levels model resolutions" renders the claim indefinite because it is unclear what the applicants mean. See MPEP § 2173.05(d). For the

purpose of examining the claim, the examiner interprets this limitation as "producing plural simulation models for each one of at least set subset of said candidate circuits by configuring each configurable model in accordance with the one candidate circuit, whereby to produce a plurality of simulation models for each candidate circuit corresponding to different levels of model resolutions".

In addition, it is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The applicants state "a method of circuit model selection". It is unclear what type of circuit the applicants intend to apply the method, electronic circuits, pneumatic device circuits, or another type of circuit.

19. Dependent claims 22-27 inherit the defect as being dependent from independent claim 21.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 15, 17-20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stoica et al (Evolutionary Design of Electronic Devices and Circuits, Evolutionary Computation, 1999. IEEE CEC 99, July 1999) in view of Weste et al (Principles of CMOS VLSI Design: A System Perspective, Second Edition, 1993, Addison-Wesley Publishing Company).**

20. As per claim 15, Stoica et al teach a method of evolving a circuit comprising plural candidate circuits (p. 1272, col. 1, lines 4-9; col. 2, lines 28-35), but not with a homogenous mix of models of different levels of resolution.

Weste et al teach this feature (p. 444, section 6.6.1.5. Modes mentioned in this section are resolutions or levels of accuracy for simulation. At transistor level it is more accurate than gate/logic level, which is more accurate than block level).

It would have been obvious to one of ordinary skill in the art to combine the teachings of Stoica et al and Weste et al. Weste et al's teaching would have speed up the simulation since only those circuits requiring detailed simulation expend expensive computing time.

21. As per claim 17, Stoica et al teach a candidate circuit is modeled with a single model during a single iteration, different candidates being assigned to models of different resolution levels during various iterations (p. 1272, col. 1, lines 4-9; col. 2, lines 28-35. Stoica et al recites, "Each generation the GA produces a new population of binary chromosomes, which get converted into structural parameters that enter device models, or voltages in Spice netlists that describe candidate circuit designs". Since device models are mentioned without any further limitation, they can be interpreted as a single of model of resolution and then different iterations being assigned different models of resolution).

22. As per claim 18, Stoica et al teach each candidate circuit is modeled at all levels of resolution within a finite number of iterations (p. 1272, col. 1, lines 4-9; col. 2, lines 28-35. SPICE simulation tool has a finite number of models of different levels of resolution. Hence, after a finite number of iterations these models should be exhausted).

23. As per claim 19, Stoica et al do not teach not all candidate circuits are assigned to a different resolution level model at each iteration.

Weste et al teach this feature (p. 444, section 6.6.1.5. A circuit design does not necessary include all types of circuit levels mentioned in. Weste et al teach matching mode or resolution model to appropriate type of circuit. Hence, it can be interpreted that Weste et al teach not all candidate circuits are assigned to a different resolution level model at each iteration).

24. As per claim 20, this limitation has already been discussed in claim 18. It is, therefore, rejected for the same reasons.

### ***Allowable Subject Matter***

**Claims 1, 8, and 21 would be allowable if rewritten or amended to overcome the rejections under 35 USC § 101 and 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.**

25. As per claim 1, it would be allowable if rewritten or amended to overcome the rejections under 35 USC § 101 and 35 U.S.C. 112, 2nd paragraph, because of the following features:

- assigning each one of a plurality configurable circuit models of different levels of model resolutions to different individual ones of at least subset of said plural candidate circuits;
- producing a simulation model for each one of at least said subset of said candidate circuits by configuring configurable model assigned to the one candidate circuit accordance with the one candidate circuit, whereby to produce plurality of simulation models

corresponding to at least said subset said candidate circuits whose resolutions are distributed among said different levels model resolutions;

obtaining from each simulation model a fitness function the corresponding candidate circuit;

ranking said candidate circuits in accordance with said fitness functions;

changing assignments of candidate circuits among said configurable circuit models;

repeating the steps of producing, obtaining and ranking, whereby to perform them in successive iterations.

26. As per claim 8, it would be allowable if rewritten or amended to overcome the rejections under 35 USC § 101 and 35 U.S.C. 112, 2nd paragraph, because of the following features:

assigning every one plurality of configurable circuit models of different levels of model resolutions to each one of at least a subset of said plural candidate circuits;

producing plural simulation models for each one of at least set subset of said candidate circuits by configuring each configurable model in accordance with the one candidate circuit, whereby to produce a plurality of simulation models for each candidate circuit;

obtaining from the plurality of simulation models of each candidate circuit a plurality fitness functions of the corresponding candidate circuit, and combining said plurality of fitness functions into a single fitness function of the one candidate circuit;

ranking said candidate circuits in accordance with their fitness functions.

27. As per claim 21, it would be allowable if rewritten or amended to overcome the rejections under 35 USC § 101 and 35 U.S.C. 112, 2nd paragraph, because of the following features:

assigning each one of a plurality configurable circuit models of different levels of model resolutions to different individual ones of at least subset of said plural candidate circuits;

producing a simulation model for each one of at least said subset of said candidate circuits by configuring configurable model assigned to the one candidate circuit accordance with the one candidate circuit, whereby to produce plurality of simulation models corresponding to at least said subset said candidate circuits whose resolutions are distributed among said different levels model resolutions;

obtaining from each simulation model a fitness function the corresponding candidate circuit;

ranking said candidate circuits in accordance with said fitness functions;

changing assignments of candidate circuits among said configurable circuit models;

repeating the steps of producing, obtaining and ranking, whereby to perform them in successive iterations.

**Claims 2-7, 9-14, 16, 22-27 would be allowable if rewritten to overcome the rejections under 35 USC § 101 and 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.**

28. As per claims 2-7, they would be allowable if rewritten to overcome the rejections under 35 USC § 101 and 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim 1 and any intervening claims.

29. As per claims 9-14, they would be allowable if rewritten to overcome the rejections under 35 USC § 101 and 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim 8 and any intervening claims.

30. As per claims 16, it would be allowable if rewritten to overcome the rejections under 35 USC § 101 and 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim 15 and any intervening claims.

31. As per claims 22-27, they would be allowable if rewritten to overcome the rejections under 35 USC § 101 and 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim 21 and any intervening claims.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cuong V. Luu whose telephone number is 571-272-8572. The examiner can normally be reached on Monday-Friday 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini Shah, can be reached on 571-272-2279. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. An inquiry of a general nature or relating to the status of this application should be directed to the TC2100 Group receptionist: 571-272-2100.

Art Unit: 2128

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CVL

  
KAMINI SHAH  
SUPERVISORY PATENT EXAMINER